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| EXAMINER | |
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| NEWPORT, JONATHAN M | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/518,075 | AUSSERRE ET AL. | |
| | Examiner | Art Unit | |
| | JONATHAN M. NEWPORT | 4176 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 December 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *12/16/2004*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *"Visual Detection of organic monomolecular films by interference colors" pp. 472-478; "Ellipsometry and Polarized Light" selected text; "Built-Up Films of Barium Stearate and Their Optical Properties"*.

## DETAILED ACTION

1. This office action is in response to the applicant's communication filed on 12/16/2004. In virtue of this communication, claims 1-21 are currently presented in the instant application.

### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Drawings*

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the *crossed polarizers*, *polarizing microscope*, *optical microscope*, *quarter-wave blade*, *Petri dish* and *differential interferential contrast* device must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the *crossed polarizers*, *polarizing microscope*, *optical microscope*, *quarter-wave blade* and *differential interferential contrast* device as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

5. The drawings are objected to because the angles $\theta_0$ and $\Delta\theta_0$ do not correspond to their respective description in the specification (see page 10 lines 3-7).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

6. The disclosure is objected to because of the following informalities:

page 8, line 7, "to" should be changed to --in--;

page 8, line 24, the second instance of "a" should be changed to --an--;

page 11, line 19, "le" should be changed to --the--

page 16, line 19, "transformer" should be changed to --transform--;

page 17, line 7, "$r_{01(p)}+r_{12(p)}e^{(-2j\beta)}$" should be changed to --$r_{01(p)}r_{12(p)}e^{(-2j\beta)}$--;

page 18, line 18, "Let us remind" should be changed to --recall--;

page 21, line 29, "mall" should be changed to --small--;

page 21, line 31, "blade" should be changed to --waveplate--;

page 22, line 23, "complexes" should be deleted;

page 24, line 14, "-" (i.e. the negative in the denominator of equation (E50)) should be changed to --+--;

page 28, line 10, "up to scratch" should not be highlighted;

page 29, line 24, "axe y" should be changed to --y axis--;

page 31, line 11, "under" should be changed to --unless--;

page 32, line, "," should be changed to --.--.

Appropriate correction is required.

7. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Objections - Minor Informalities***

8. Claims 1-20 are objected to because of the following informalities:

claim 1, line 3, "of index" should be changed to --of refraction index--;

claim 1, line 16, "$r_{01(p)}+r_{12(p)}e^{(-2j\beta)}$" should be changed to --$r_{01(p)}r_{12(p)}e^{(-2j\beta)}$--;

claim 1, lines 19-24, "*j*" should be changed to --*k*-- or another suitable variable so as to distinguish the index from the complex number "*j*" in claim 1, lines 15-16;

claim 1, lines 15-28 are objected to for not defining in the claim all variables and corresponding subscripts used in equations defining the support structure;

claim 1 line 19, ":" should be deleted;

claim 2, line 3, "of index" should be changed to --of refraction index--;

claim 2, line 16, "$r_{01(p)}+r_{12(p)}e^{(-2j\beta)}$" should be changed to --$r_{01(p)}r_{12(p)}e^{(-2j\beta)}$--;

claim 2, lines 19-24, "*j*" should be changed to --*k*-- or another suitable variable so as to distinguish the index from the complex number "*j*" in claim 2, lines 15-16;

claim 2, lines 15-26 are objected to for not defining in the claim all variables and corresponding subscripts used in equations defining the support structure;

claim 3, line 21, "$r_{01(p)}+r_{12(p)}e^{(-2j\beta)}$" should be changed to --$r_{01(p)}r_{12(p)}e^{(-2j\beta)}$--;

claim 3, lines 19-24, "*j*" should be changed to --*k*-- or another suitable variable so as to distinguish the index from the complex number "*j*" in claim 2, lines 15-16;

claim 3, lines 15-30 are objected to for not defining in the claim all variables and corresponding subscripts used in equations defining the support structure;

claim 4, line 5, --.-- shoud be added to the end of the claim;

claim 5, line 3, "module" should be changed to --modulus--;

claim 6, line 8, "k integer" should be changed to --integer k--;

claim 8, line 4, "its" should be changed to --a--;

claim 8 line 6 --.-- shoud be added to the end of the claim;

claim 11, line 3, "□" should be changed to --λ--;

claim 12, line 3, --layer-- should be inserted between the first instance of "the" and "(2)";

claim 12, line 6, "□" should be changed to --λ--;

claim 12, line 7, --.-- shoud be added to the end of the claim;

claim 13, line 7, "." should be deleted and --.-- should be placed at the end of the claim;

claim 13, line 7, "□" should be changed to --λ--;

claim 14, line 7, "□" should be changed to --λ--;

claim 14, line 8, "□" should be changed to --λ--;

claim 14, line 8, "." should be deleted and --.-- should be placed at the end of the claim;

claim 16, line 6, "this dish" should be changed to "the Petri dish";

claim 19, line 3, "blade" should be changed to --plate--;

claim 21, line 2, "the" should be changed to --an--.

Appropriate correction is required.

9. Regarding claims 12, 13 and 14, the tables indicating various substrate materials, layer indices of refraction and layer thicknesses should be placed in the specification for supporting the claim limitations. Specific configurations of materials and construction must be in individual claims as there is a practical way to define the invention in words. See MPEP §2173.05(s).

10. The applicant is reminded that the recitation regarding the structure of the antiglare support in claims 1-3 and additional structures in claims 4-5, 8 and 16 have not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). For the purposes of examination, it is understood that the structural limitations are in the body of the claim and not in the preamble. Moving the structural description from the preamble into the body of the claim would clarify the record as to what specifically the claimed invention comprises.

***Claim Rejections - 35 USC § 112***

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 1-3, 11-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, line 4, the term "incoherent" renders the claim indefinite because it is unclear what type of incoherency the incident convergent illumination exhibits. The illumination as stated has, for example, a degree of polarization coherence which contradicts the statement of general incoherency.

Regarding claim 2, line 4, the term "incoherent" renders the claim indefinite because it is unclear what type of incoherency the incident convergent illumination exhibits. The illumination as stated has, for example, a degree of polarization coherence which contradicts the statement of general incoherency.

Regarding claim 3, line 4, the term "incoherent" renders the claim indefinite because it is unclear what type of incoherency the incident convergent illumination exhibits. The illumination as stated has, for example, a degree of polarization coherence which contradicts the statement of general incoherency.

Regarding claims 11-14, the tables and recitations present the index of refraction of the layer and the thickness of the layer on a given substrate, but there is insufficient support in the claims or the specification to identify the materials used to execute the invention, thus rendering the claims indefinite. Clarification is required.

Claims 1-3 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:

claim 1, line 4, the "illumination under angle $\theta_0$" renders the claim incomplete as it is not clear from what reference point, line or plane the "angle $\theta_0$" regards;

claim 1, lines 6-8, the structural cooperative relationship between a "substrate (1)" and a "layer (2)" is not positively recited in the claim thus rendering the claim incomplete;

claim 2, line 4, the "illumination under angle $\theta_0$" renders the claim incomplete as it is not clear from what reference point, line or plane the "angle $\theta_0$" regards;

claim 2, lines 6-8, the structural cooperative relationship between a "substrate (1)" and a "layer (2)" is not positively recited in the claim thus rendering the claim incomplete;

claim 3, line 5, the "illumination under angle $\theta_0$" renders the claim incomplete as it is not clear from what reference point, line or plane the "angle $\theta_0$" regards;

regarding claim 3, lines 6-8, the structural cooperative relationship between a "substrate (1)" and a "layer (2)" is not positively recited in the claim thus rendering the claim incomplete. Clarification is required.

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not

commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 1-10, 15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azzam et al. ("Ellipsometry and Polarized Light", Azzam and Bashara, North Holland Elsevier Science Publishers, 1989) in view of Sandstroem et al. ("Visual detection of organic monomolecular films by interference colors", Applied Optics, Vol. 24, No. 4, 15 February 1985).

With regard to claim 1, Azzam et al discloses a support (which is equivalent to an ambient-film-substrate system, see page 283, section 4.3) intended for observing between crossed polarizers (which is equivalent to the incident wave being linearly polarized and the information on polarization being restored, see page 285, paragraph 2, within the context of a physical structure this is performed with a linear polarizer and retarder as the first polarizer and a retarder and a linear analyzer as the second polarizer with the support in between the two, see Azzam, et al. page 366, paragraph 1) in a medium of index $n_0$ (which is equivalent to the ambient media, see page 283, Fig. 4.14) with spatially incident convergent incoherent illumination under an angle $\theta_0$ (which is equivalent to $\varphi_0$, see page 283, Fig. 4.14) at a wavelength $\lambda$, including, a substrate (see page 283, Fig. 4.14) of complex refraction index $n_2$, a layer (which is equivalent to a film, see page 283, Fig. 4.14) of complex refraction index $n_1$ and of thickness $e_1$ (which is equivalent to $d_1$, see page 283 Fig. 4.14) characterized in that, the value of the thickness $e_1$ of the layer is within 2% (which is equivalent to taking the numerical inversion of the exact equations as detailed in section 4.5, see pages 315-320) with

$$\sigma = \frac{\sigma_{01} + \sigma_{12}(1+\pi_{01})e^{-2j\beta} + \sigma_{01}\pi_{12}e^{-2j\beta}}{(1+r_{01(p)}r_{12(p)}e^{-2j\beta})(1+r_{01(s)}r_{12(s)}e^{-2j\beta})}$$

(which is equivalent to the total reflection of the p and s polarization states, see page 285, Eqns. 4.37 and 4.38)

a formula wherein and represent respectively the sum and the product of the Fresnel coefficients (see p. 286, equations 4.41-4.44) of the different interfaces [(i,j)=(0,1) or (1,2)]

$$r_{ij(p)} = \frac{n_j \cos\theta_i - n_i \cos\theta_j}{n_j \cos\theta_i + n_i \cos\theta_j}$$

and

$$r_{ij(s)} = \frac{n_i \cos\theta_i - n_j \cos\theta_j}{n_i \cos\theta_i + n_j \cos\theta_j}$$

and wherein

$$\beta_1 = \frac{2\pi n_1 e_1 \cos\theta_1}{\lambda}$$

(which is equivalent to the film phase thickness, see page 284, Eqn. 4.31),

with

$$\cos\theta_1 = \sqrt{1 - \left(\frac{n_0}{n_1}\right)^2 \sin^2(\theta_0)}$$

(which is equivalent to Snell's Law, see page 284, Eqn. 4.32).

Azzam et al. does not disclose an object or $\frac{d^2}{de_1^2}\ln|\sigma|^2 = 0$. Sandström et al. discloses an object (which is equivalent to a biolayer, see page 475, Col. 2, lines 14-35) a support (which is equivalent to the dielectric layer-substrate system, see page 473, Fig. 1)

wherein the thickness of the layer (which is equivalent to the thickness of a dielectric layer) should be chosen so as to maximize the monochromatic or polychromatic contrast (which is equivalent to finding the proper roots of the derivative of *any* continuous function of total reflectance of polarized light σ from an ambient-film-substrate system, see page 473, Col. 1, lines 10-13 through Col. 2 lines 1-20, note that in this case the second derivative arises as per an approximation of the contrast ratio through linear expansion). Therefore, to modify the support of Azzam et al. to provide for a particular layer thickness would have been obvious to one of ordinary skill in the art at the time the invention was made to maximize the contrast ratio.

With regard to claim 2, Azzam et al discloses a support (which is equivalent to an ambient-film-substrate system, see page 283, section 4.3) intended for observing between crossed polarizers (which is equivalent to the incident wave being linearly polarized and the information on polarization being restored, see page 285, paragraph 2, within the context of a physical structure this is performed with a linear polarizer and retarder as the first polarizer and a retarder and a linear analyzer as the second polarizer with the support in between the two, see Azzam, et al. page 366, paragraph 1) an object placed on the support or in the vicinity thereof in a medium of index $n_0$ (which is equivalent to the ambient media, see page 283, Fig. 4.14) with spatially incident convergent incoherent illumination under an angle $\theta_0$ (which is equivalent to $\varphi_{0,}$ see page 283, Fig. 4.14) at a wavelength $\lambda$, including, a substrate (see page 283, Fig. 4.14) of complex refraction index $n_2$, a layer (which is equivalent to a film, see page 283, Fig. 4.14) of complex refraction index $n_1$ and of thickness $e_1$ (which is equivalent to $d_1$, see page 283 Fig. 4.14) characterized in that, the value of the thickness

$e_1$ of the layer is within 2% (which is equivalent to taking the numerical inversion of the exact equations as detailed in section 4.5, see pages 315-320) with

$\sigma \equiv \frac{\sigma_{01} + \sigma_{12}(1+\pi_{01})e^{-2j\beta} + \sigma_{01}\pi_{12}e^{-2j\beta}}{(1+r_{01(p)}r_{12(p)}e^{-2j\beta})(1+r_{01(s)}r_{12(s)}e^{-2j\beta})}$ (which is equivalent to the total reflection of the p and s polarization states, see page 285, Eqns. 4.37 and 4.38)

a formula wherein and represent respectively the sum and the product of the Fresnel coefficients (see p. 286, equations 4.41-4.44) of the different interfaces [(i,j)=(0,1) or (1,2)]

$$r_{ij(p)} = \frac{n_j \cos\theta_i - n_i \cos\theta_j}{n_j \cos\theta_i + n_i \cos\theta_j}$$

and

$$r_{ij(s)} = \frac{n_i \cos\theta_i - n_j \cos\theta_j}{n_i \cos\theta_i + n_j \cos\theta_j}$$

and wherein

$$\beta_1 = \frac{2\pi n_1 e_1 \cos\theta_1}{\lambda}$$

(which is equivalent to the film phase thickness, see page 284, Eqn. 4.31),

with

$$\cos\theta_1 = \sqrt{1 - \left(\frac{n_0}{n_1}\right)^2 \sin^2(\theta_0)}$$

(which is equivalent to Snell's Law, see page 284, Eqn. 4.32).

Azzam et al. does not disclose an object or $\frac{d^2}{de_1^2}\ln|\sigma|^2 = 0$. Sandström et al. discloses an object (which is equivalent to a biolayer, see page 475, Col. 2, lines 14-35) and a support

(which is equivalent to the dielectric layer-substrate system, see page 473, Fig. 1) wherein the thickness of the layer (which is equivalent to the thickness of a dielectric layer) should be chosen so as to maximize the monochromatic and polychromatic contrast (which is equivalent to finding the proper roots of the derivative of *any* continuous function of total reflectance of polarized light σ from an ambient-film-substrate system, see page 473, Col. 1, lines 10-13 through Col. 2 lines 1-20). Therefore, to modify the support of Azzam et al. to provide for a particular layer thickness would have been obvious to one of ordinary skill in the art at the time the invention was made to maximize the contrast ratio.

With regard to claim 3, Azzam et al discloses a support (which is equivalent to an ambient-film-substrate system, see page 283, section 4.3) intended for observing between crossed polarizers (which is equivalent to the incident wave being linearly polarized and the information on polarization being restored, see page 285, paragraph 2, within the context of a physical structure this is performed with a linear polarizer and retarder as the first polarizer and a retarder and a linear analyzer as the second polarizer with the support in between the two, see Azzam, et al. page 366, paragraph 1) an object placed on the support or in the vicinity thereof in a medium of index $n_0$ (which is equivalent to the ambient media, see page 283, Fig. 4.14) with spatially incident convergent incoherent illumination under an angle $\theta_0$ (which is equivalent to $\varphi_{0,}$ see page 283, Fig. 4.14) at a wavelength $\lambda$, including, a substrate (see page 283, Fig. 4.14) of complex refraction index $n_2$, a layer (which is equivalent to a film, see page 283, Fig. 4.14) of complex refraction index $n_1$ and of thickness $e_1$ (which is equivalent to $d_1$, see page 283 Fig. 4.14) characterized in that, the value of the thickness

$e_1$ of the layer is within 2% (which is equivalent to taking the numerical inversion of the exact equations as detailed in section 4.5, see pages 315-320) with

$$R_{NP} = \frac{1}{4}\left|r_p + r_s\right|^2 + \frac{1}{4}\left|r_p - r_s\right|^2$$

(which is the commonly known standard non-polarized light intensity, see for example equivalent expressions in Azzam et al. p. 16-26)

$$r_p = \frac{r_{01(p)} + r_{12(p)}e^{-2j\beta_1}}{1 + r_{01(p)}r_{12(p)}e^{-2j\beta_1}} \text{ and } r_s = \frac{r_{01(s)} + r_{12(s)}e^{-2j\beta_1}}{1 + r_{01(s)}r_{12(s)}e^{-2j\beta_1}}$$

(see Azzam page 285 eqns. 4.37 and 4.38)

$$\sigma = r_p + r_s = \frac{\sigma_{01} + \sigma_{12}(1+\pi_{01})e^{-2j\beta} + \sigma_{01}\pi_{12}e^{-2j\beta}}{(1 + r_{01(p)}r_{12(p)}e^{-2j\beta})(1 + r_{01(s)}r_{12(s)}e^{-2j\beta})}$$

(which is equivalent to the total reflection of the p and s polarization states, see page 285, Eqns. 4.37 and 4.38)

a formula wherein and represent respectively the sum and the product of the Fresnel coefficients (see p. 286, equations 4.41-4.44) of the different interfaces [(i,j)=(0,1) or (1,2)]

$$r_{ij(p)} = \frac{n_j \cos\theta_i - n_i \cos\theta_j}{n_j \cos\theta_i + n_i \cos\theta_j}$$

and

$$r_{ij(s)} = \frac{n_i \cos\theta_i - n_j \cos\theta_j}{n_i \cos\theta_i + n_j \cos\theta_j}$$

and wherein

$$\beta_1 = \frac{2\pi n_1 e_1 \cos\theta_1}{\lambda}$$

(which is equivalent to the film phase thickness, see page 284, Eqn. 4.31),

with

$$\cos\theta_1 = \sqrt{1 - \left(\frac{n_0}{n_1}\right)^2 \sin^2(\theta_0)}$$

(which is equivalent to Snell's Law, see page 284, Eqn. 4.32).

Azzam et al. does not disclose an object or $\frac{d^2}{de_1^2}\ln|\sigma|^2 = 0$. Sandström et al. discloses an object (which is equivalent to a biolayer, see page 475, Col. 2, lines 14-35) and a support (which is equivalent to the dielectric layer-substrate system, see page 473, Fig. 1) wherein the thickness of the layer (which is equivalent to the thickness of a dielectric layer) should be chosen so as to maximize the monochromatic and polychromatic contrast (which is equivalent to finding the proper roots of the derivative of *any* continuous function of total reflectance of polarized light σ from an ambient-film-substrate system, see page 473, Col. 1, lines 10-13 through Col. 2 lines 1-20). Therefore, to modify the support of Azzam et al. to provide for a particular layer thickness would have been obvious to one of ordinary skill in the art at the time the invention was made to maximize the contrast ratio.

With regard to claim 4, the combination of Azzam et al. and Sandström et al. discloses a support characterized in that the values of the refraction index $n_1$ and of the thickness $e_1$ of the layer are within 2% such that σ=0 (which is equivalent to a dielectric layer that forms a perfect antireflection (AR) coating, see page 437, Col. 2, lines 13-15).

With regard to claim 5, the combination of Azzam et al. and Sandström et al. discloses a support characterized in that the substrate and the layer are dielectric or little

absorbent, the module of the imaginary portion of their complex index (which is equivalent to an absorption coefficient) being smaller that 0.01 (which equivalent to a dielectric layer of an oxide of silicon on a substrate of glass or plastic, see page 476, Col. 1 lines 33-38 and page 476, Col. 1 lines 52 through Col. 2 lines 1-12), the general conditions being reduced to the conditions:

$$n_1 e_1 \cos\theta_1 = \frac{\lambda}{4} + k\frac{\lambda}{2}$$

(which is satisfied to within 2% by a range of values present in the system with a wedgelike thickness profile of Sandström et al. Fig. 8, see page 476 Col. 2 lines 14-22 and page 477, Col. 1, lines 1-25) and

$$n_1^2 = n_2^2 + \frac{\sqrt{n_2^2 \cos^2\theta_0 (n_2^2 - n_0^2 \sin^2\theta_0)}}{n_2^2 + n_0^2 \cos^2\theta_0}$$

(which is inherent in dielectric ambient-film-substrate systems)

with k integer and with an uncertainty of 2% on the values of $n_1$ and $e_1$.

With regard to claim 6, the combination of Azzam et al. and Sandström et al. discloses a support characterized in that $\theta_0$ is smaller than 5° (which is equivalent to deviations up to 30° from perpendicular incidence, see Sandström et al. page 475, Col. 1, lines 25-28), the general conditions being reduced to

$$\frac{2}{n_1^2} = \frac{1}{n_0^2} + \frac{1}{n_2^2}$$

(which is satisfied to within 2% by a range of values present in the system with a wedgelike thickness profile of Sandström et al. Fig. 8, see page 476 Col. 2 lines 14-22 and page 477, Col. 1, lines 1-25), and

$$n_1 e_1 \cos\theta_1 = \frac{\lambda}{4} + k\frac{\lambda}{2}$$

with integer k and with an uncertainty of 2% on the values of $n_1$ and $e_1$.

With respect to claims 7-10 the combination of Azzam et al. and Sandström et al. discloses a support as recited in claim 1. The limitation of "illumination" recited in each of the claims is not of patentable merits since it is directed to an intended use which does not differentiate the claim from the prior art. A claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim. See MPEP §2114.

With regard to claim 15, the combination of Azzam et al. and Sandström et al. discloses a support characterized in that the parameters are kept with the exception of the wavelength λ and of the thickness $e_1$ of the layer 2 which are modified proportionally, $e_1/\lambda$ not being modified (which, given a particular illumination angle and layer index of refraction, is equivalent to keeping the intensity contrast ratio constant, see Sandström et al. page 473, Eqn. 5 and Azzam et al. page 284, Eqn. 4.31).

With regard to claim 17, the combination of Azzam et al. and Sandström et al. discloses a device for observing a sample including an optical microscope (which is equivalent to a binocular viewing instrument with a collimating lens and an intense light source, see Sandström et al. page 478, Col. 1, lines 1-3) a support intended for receiving said sample and two crossed polarizers.

With regard to claim 19, the combination of Azzam et al. and Sandström et al. discloses a device for observing a sample including an optical microscope (which is

equivalent to a binocular viewing instrument with a collimating lens and an intense light source, see Sandström et al. page 478, Col. 1, lines 1-3) a support intended for receiving said sample a polarizer and a quarter-wave blade (which is equivalent to a retarder, see Azzam et al., page 366, Paragraph 1).

16. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azzam et al. and Sandström et al. applied to claim 1 above, and further in view of Meredith, Jr. (US Patent No. 5,812,405).

With regard to claim 11, the combination of Azzam et al. and Sandström et al. discloses a support for use in the air as a surrounding medium. The combination does not disclose a substrate and layer having the specifications in the claimed table. Meredith discloses a substrate (which is equivalent to a substrate of arbitrary complex index of refraction, see Fig. 1a [12], and Col. 3, lines 16-26) and a layer with a complex index of refraction (which is equivalent to a thin film material with arbitrary index of refraction, see Fig. 1a [11], and Col. 3, lines 16-26) for use in air (see Col. 3, line 17) and in particular configurations (see Col. 2, lines 14-28, Col. 3, lines 24-26 and Col. 4, lines 9-17). Therefore, to modify the support of Azzam et al. and Sandström et al. by providing a particular combination of materials and material configurations as taught by Meredith Jr. would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the contrast ratio between the support and the object on the support.

With regard to claim 12, the combination of Azzam et al. and Sandström et al. discloses a support for use in the air as a surrounding medium. The combination does not disclose a substrate and layer having the specifications in the claimed table. Meredith

discloses a substrate (which is equivalent to a substrate of arbitrary complex index of refraction, see Fig. 1a [12], and Col. 3, lines 16-26) and a layer with a complex index of refraction (which is equivalent to a thin film material with arbitrary index of refraction, see Fig. 1a [11], and Col. 3, lines 16-26) for use in air (see Col. 3, line 17) and in particular configurations (see Col. 2, lines 14-28, Col. 3, lines 24-26 and Col. 4, lines 9-17). Therefore, to modify the support of Azzam et al. and Sandström et al. by providing a particular combination of materials and material configurations as taught by Meredith Jr. would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the contrast ratio between the support and the object on the support.

With regard to claim 13, the combination of Azzam et al. and Sandström et al. discloses a support for use in the air as a surrounding medium. The combination does not disclose a substrate and layer having the specifications in the claimed table. Meredith discloses a substrate (which is equivalent to a substrate of arbitrary complex index of refraction, see Fig. 1a [12], and Col. 3, lines 16-26) and a layer with a complex index of refraction (which is equivalent to a thin film material with arbitrary index of refraction, see Fig. 1a [11], and Col. 3, lines 16-26) for use in air (see Col. 3, line 17) and in particular configurations (see Col. 2, lines 14-28, Col. 3, lines 24-26 and Col. 4, lines 9-17). Therefore, to modify the support of Azzam et al. and Sandström et al. by providing a particular combination of materials and material configurations as taught by Meredith Jr. would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the contrast ratio between the support and the object on the support.

With regard to claim 14, the combination of Azzam et al. and Sandström et al. discloses a support for use in the air as a surrounding medium. The combination does not disclose a substrate and layer having the specifications in the claimed table. Meredith discloses a substrate (which is equivalent to a substrate of arbitrary complex index of refraction, see Fig. 1a [12], and Col. 3, lines 16-26) and a layer with a complex index of refraction (which is equivalent to a thin film material with arbitrary index of refraction, see Fig. 1a [11], and Col. 3, lines 16-26) and in particular configurations (see Col. 2, lines 14-28, Col. 3, lines 24-26 and Col. 4, lines 9-17). Therefore, to modify the support of Azzam et al. and Sandström et al. by providing a particular combination of materials and material configurations as taught by Meredith Jr. would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the contrast ratio between the support and the object on the support.

17. Claims 16, 18, 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Azzam et al. and Sandstroem et al. as applied to claims 1 above, and further in view of Bogart et al. (US Patent No. 5,639,671).

With regard to claim 16, the combination of Azzam et al. and Sandström et al. discloses a support intended for receiving said sample. The combination does not disclose an accessory intended for observing a preferably liquid sample formed of a Petri dish and a support. Bogart et al discloses an accessory intended for observing a liquid sample formed of a Petri dish (which is equivalent to a sample well, see [3] in Fig. 12A and Col. 38, lines 26-28) and a support (which is equivalent to a substrate which has an optically active surface, see [3] in Fig. 6A and Col. 2 lines 49-50). Therefore, to modify the support of Azzam et al. and Sandström et al. to provide for an accessory formed of a

support at the bottom of a Petri Dish would have been obvious to one of ordinary skill in the art at the time the invention was made to receive, contain, react and/or preserve a sample to be tested.

With regard to claim 18, the combination of Azzam et al. and Sandström et al. discloses device for observing a sample including an optical microscope and two crossed polarizer. The combination does not disclose an accessory intended for observing a preferably liquid sample formed of a Petri dish and a support. Bogart et al discloses an accessory intended for observing a liquid sample formed of a Petri dish (which is equivalent to a sample well, see [3] in Fig. 12A and Col. 38, lines 26-28) and a support (which is equivalent to a substrate which has an optically active surface, see [3] in Fig. 6A and Col. 2 lines 49-50). Therefore, to modify the support of Azzam et al. and Sandström et al. to provide for an accessory to be viewed in a microscope formed of a support at the bottom of a Petri Dish would have been obvious to one of ordinary skill in the art at the time the invention was made to receive, contain, react and/or preserve a sample to be tested.

With regard to claim 20, the combination of Azzam et al. and Sandström et al. discloses device for observing a sample including an optical microscope a polarizer and a quarter wave blade (which is equivalent to a retarder). The combination does not disclose an accessory intended for observing a preferably liquid sample formed of a Petri dish and a support. Bogart et al discloses an accessory intended for observing a liquid sample formed of a Petri dish (which is equivalent to a sample well, see [3] in Fig. 12A and Col. 38, lines 26-28) and a support (which is equivalent to a substrate which has an optically active surface, see [3] in Fig. 6A and Col. 2 lines 49-50). Therefore, to modify

the support of Azzam et al. and Sandström et al. to provide for an accessory to be viewed in a microscope formed of a support at the bottom of a Petri Dish would have obvious been to one of ordinary skill in the art at the time the invention was made to receive, contain, react and/or preserve a sample to be tested.

18. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Azzam et al., Sandstroem et al. and Bogart et al. as applied to claims 1 and 16 above, and further in view of Wack et al. (US Patent No. 7,130,029).

With regard to claim 21, the combination of Azzam et al., Sandström et al. and Bogart et al. discloses a device with an optical microscope (which is equivalent to a binocular viewing instrument with a collimating lens and an intense light source, see Sandström et al. page 478, Col. 1, lines 1-3) for observing a sample. The combination does not disclose a differential interferential contrast device. Wack et al. discloses a differential interference contrast device (which is equivalent to an optical profiling microscope coupled with the technique of differential interference contrast, see Col. 45, lines 30-51). Therefore, to modify the device of Azzam et al., Sandström et al. and Bogart et al. to provide for an optical microscope with a differential interferential contrast device would have been obvious to one skilled in the art at the time of the invention to probe a sample (which is equivalent to a specimen) with either broad- or narrow-band light (which is the equivalent to illumination) to develop images taken at different positions relative to the surface of the specimen.

***Citation of Relevant Prior Art***

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art Butterfield et al. (US Patent No. 4,747,674) discloses a contrast enhancement filter having antireflection properties.

Prior art Haaland et al. (US Patent No. 6,172,812) discloses coated optical substrates with antireflective coatings particularly regarding transparent substrates. Thickness of one or more layers are determined by minimizing the product of the fresnel reflection coefficients.

Prior art Langmuir and Blodgett ("Built-Up Films of Barium Stearate and Their Optical Properties", Physical Review, Vol. 51, June 1, 1937, pp. 964-982) discloses a method of forming thin films on substrates and analyzing their unique optical properties.

***Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN M. NEWPORT whose telephone number is (571)270-7553. The examiner can normally be reached on Monday through Thursday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thuy V. Tran can be reached on (571)272-1828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. M. N./
Examiner, Art Unit 4176
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